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## No. VII.

## NEW MODE OF SUPPORTING TOPMASTS.

*The* GOLD VULCAN MEDAL *was this session presented to Mr. G.* SMART *of Pedlars'-acre, Lambeth, for his new mode of* SUPPORTING THE TOPMASTS OF SHIPS. *A model of his invention has been placed in the Society's repository.*

THE common mode of supporting a topmast is by means of a fid, or bolt, of iron or wood, which passes transversely through the mast near its base, and rests, by its two ends, on the tressel-trees, which form part of the top or framework of timber, which, together with the cap at the head of the lower mast, (through which, also, the topmast passes,) supports this latter in a vertical position. It is also supported laterally, in two opposite directions, by the shrouds, which are strong ropes fixed at their lower end, some to the side of the vessel and some to the top of the lower mast, and all of them secured, at their upper end, to the head of the topmast.

In heavy gales, when a vessel is under way, or at anchor, the impulse of the wind against the mast is such that it acts like a power applied at the end of a very long lever to bury the lee side of the hull in the sea. The obvious remedy for this would be to lower or slide down the topmast, and thus to reduce the length of the lever; and, to a person unacquainted with practical navigation, the only operation apparently requisite for this purpose would be to knock out the fid and then to lower the topmast through the interval between the two tressel-trees.

The weight, however, of the topmast, with all its appendages, occasions so enormous a pressure on the fid that it is found quite impossible, by any power which can in that situation be applied, to drive out or withdraw the fid without previously taking off the pressure. This is done, or rather attempted to be done, by attaching a rope to the heel of the topmast, leading it through a block hooked on to the cap of the lower mast, and then conveying it below to the windlass or any other power that can be most conveniently made use of. But as in gales of wind the shrouds are always drenched with wet from the spray and the rain, and as a dry rope alway shortens by being wetted, it follows that the tension of the topmast shrouds is at such times acting in the same direction as the weight of the topmast, and in direct opposition to the heel rope, on which account it rarely happens that the fid can be relieved.

The tension of the shrouds may indeed be taken off by slackening them; but, in proportion as this is done, the lateral support of the topmast is diminished, and the most imminent hazard is incurred of its being blown away. To lower the topmasts therefore, while a ship is under way, however conducive it may be to the ease and even to the safety of the vessel, is a manœuvre not often successfully attempted even on board men of war, and scarcely ever on board merchant-men, which are always scantily manned.

The above-mentioned very serious objections to the common way of securing a topmast have induced Mr. Smart to propose the following plan, which, although as yet it wants the sanction of experiment, has been taken into consideration at two successive committees; and from its there obtaining the unanimous approval of naval officers and other professional men, is now offered to the public through the medium of the Society.

A little below the *hounds*, or shoulder of the lower mast, which supports the framework of the top, is to be formed a step *f*, (fig. 2, plate IX.) This may be done by bolting a fish to the mast in that part, if the mast is a single tree; but if built of several spars, as all large lower masts are, there will be no difficulty in making the step without the use of a fish. The face of the step is to be a plane declining outwards, and is to be strongly plated with iron or copper. A shoulder fitted to this step, and like it covered with metal plate, is to be cut in the heel of the topmast *b*: the whole weight of the topmast will therefore rest on and be supported by the step in the lower mast, and as the area of the step will be at least equal to that of the top of the fid-hole *h*, the one will be no more liable to crush in by the superincumbent weight than the other. In order to prevent the top-mast from being thrown off its step by any lateral motion, a wedge *g*, figs. 1 and 2, is driven between the top-mast and the cross tree *e*. The fid *h* is proposed to be retained, but only as a preventer in case of accident; for the bottom of the fid-hole being placed an inch above the tressel-tree *d d*, it is manifest that it bears no part of the weight of the top-mast as long as this latter rests on the step *f*.

In order to strike or lower the top-mast, the heel rope, with its tackle, is first to be applied, then the fid *h* is to be withdrawn, after which the wedge *g* is to be knocked out, and this will be done with comparatively little difficulty because the lateral pressure of the mast cannot be much, and because any difficulty likely to arise from this cause may be obviated by proportionally increasing the angle of the wedge. Nothing now remains but the exertions of two or three men with handspikes inserted between the two masts near the tressel-trees, to trip the top-mast off the sloping step *f*, and to lower it in the usual way by means of the heel-rope.

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*References to the engraving.—Plate IX.*

FIG. 1 is an elevation.
Fig. 2 is a section.
*a* The upper part of the lower mast.
*b* The lower part of the top-mast.
*c* The cap.
*d d* One of the tressel-trees.
*e e* The cross-trees.
*f* The step on which the top-mast is supported.
*g* The wedge by which the top-mast is secured in its place.
*h* The preventer fid.